

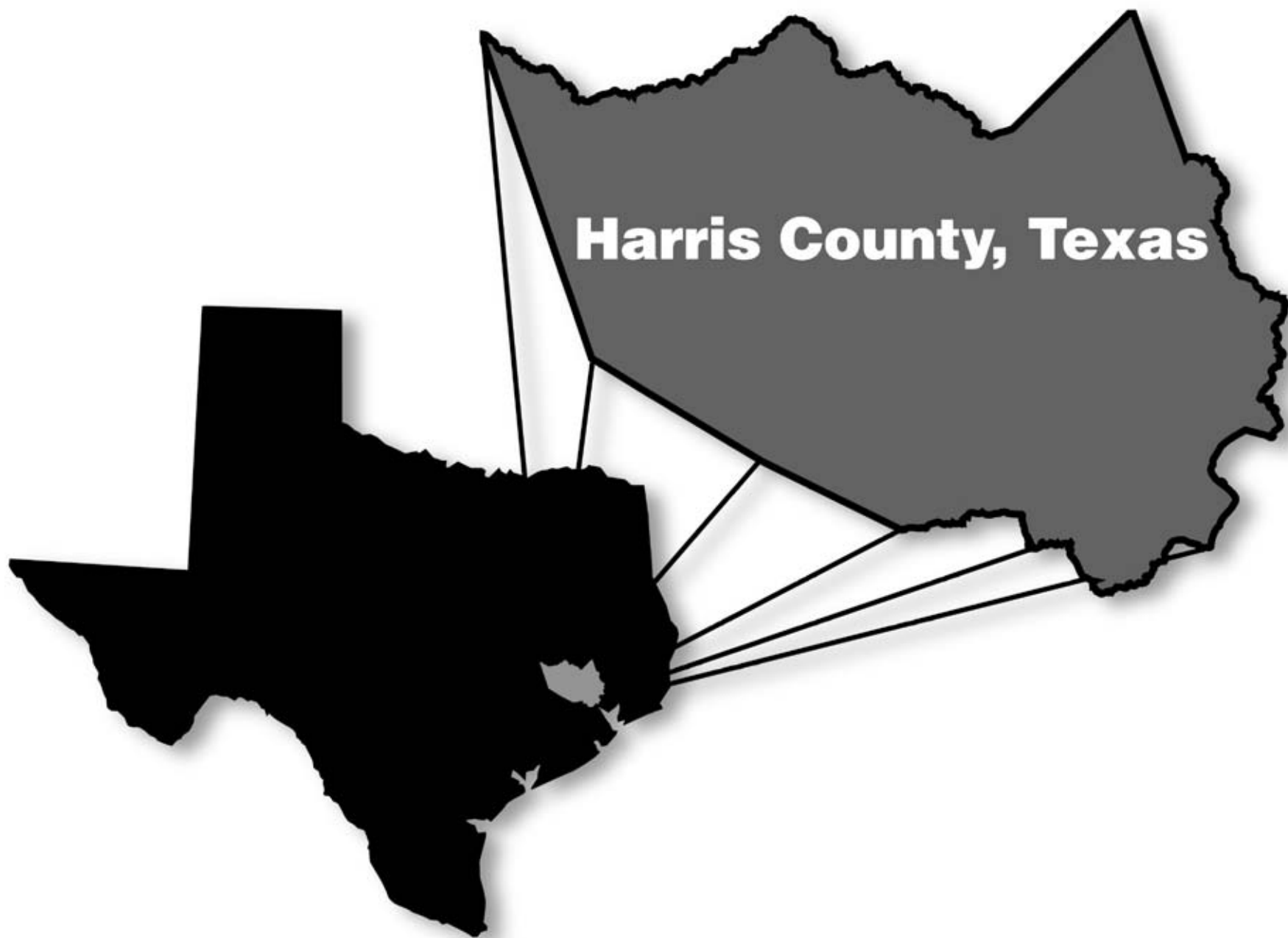
Harris County
Flood Control District

**... With Appropriate
Regard for
Community and
Natural Values**

**U.S. Army Corps of Engineers
2002 Economic and Environmental
Analysis Conference - New Orleans**

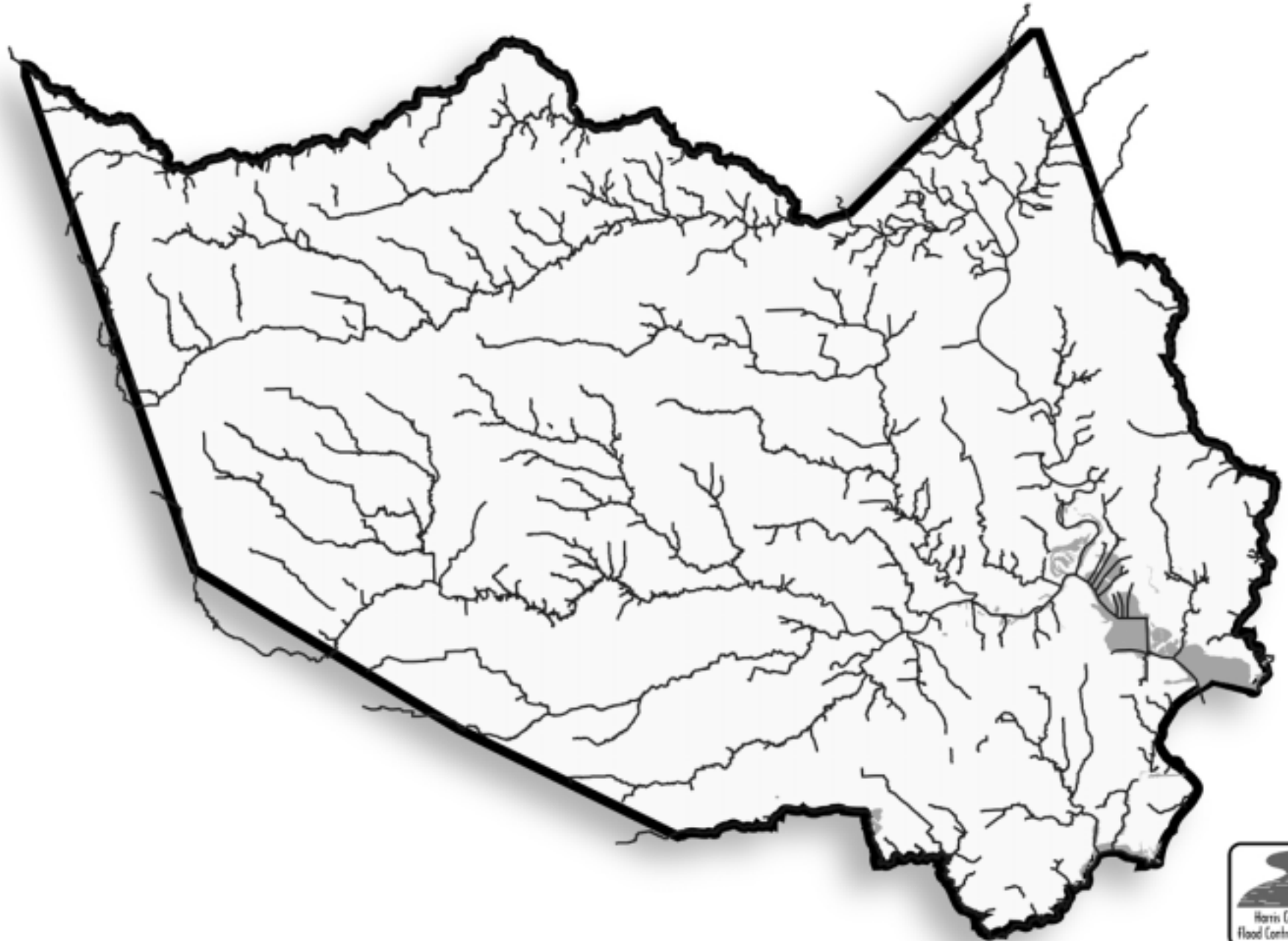
July 17, 2002

**Steve Fitzgerald
Chief Engineer
Harris County Flood Control District**

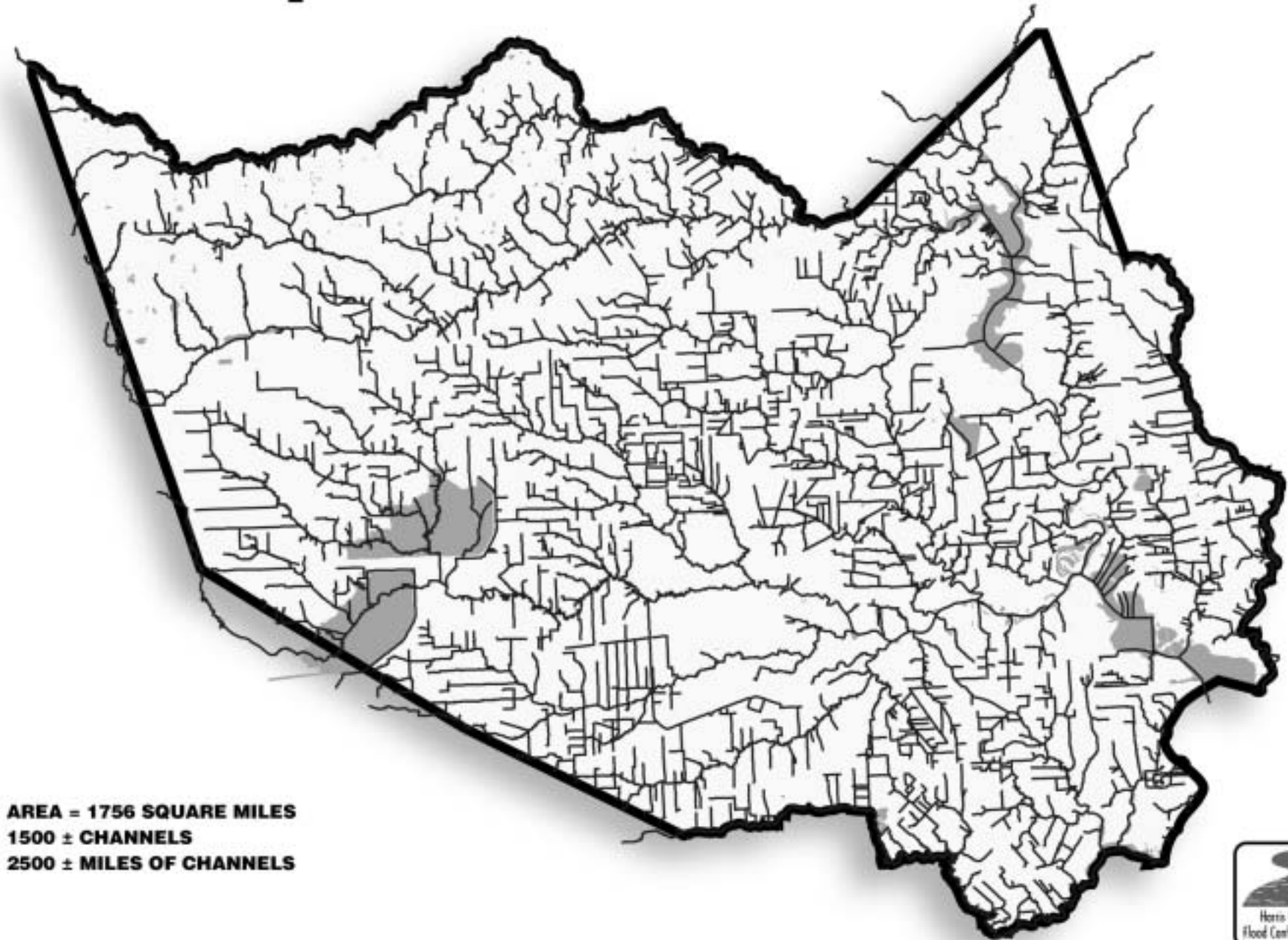


Harris County, Texas

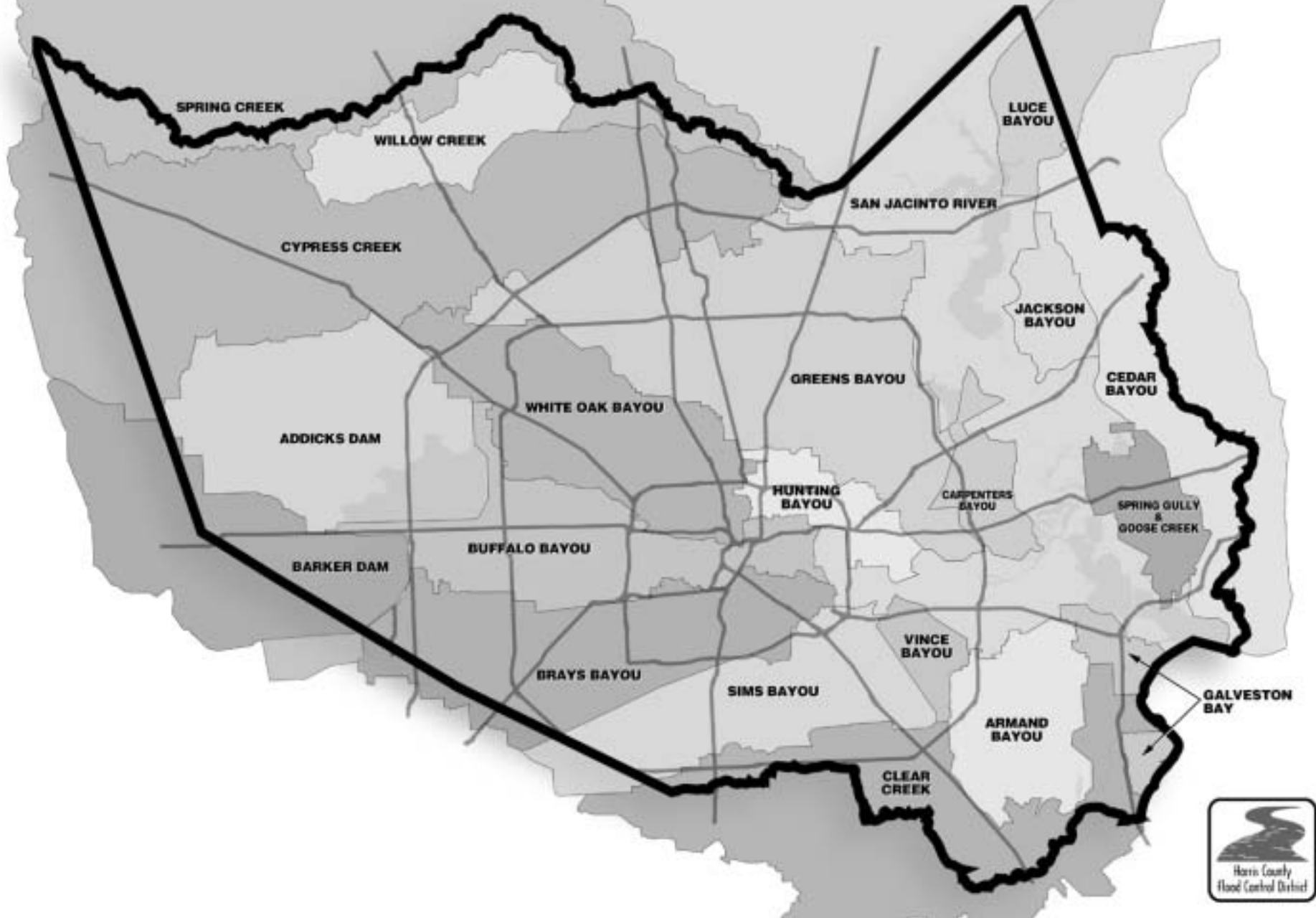
Natural Channels



Open Channel Network



Harris County Watersheds



Environmental Setting



Urban Setting

Suburbs



Urban Area



1960's Style Channel



Background

- **About 2500 miles of channels**
- **Population about 3.4 million (32 cities)**
- **For 7 floods since 1989, house flooding in range of 300 - 3,200 per flood**
- **Almost all houses flooded more than once were built in the 1960's & 1970's**

Then Tropical Storm Allison hit us hard in June 2001 . . .



Tropical Storm Allison

June 5 – 10, 2001



Hunting Bayou, Holiday Forest, 6/9/01 am

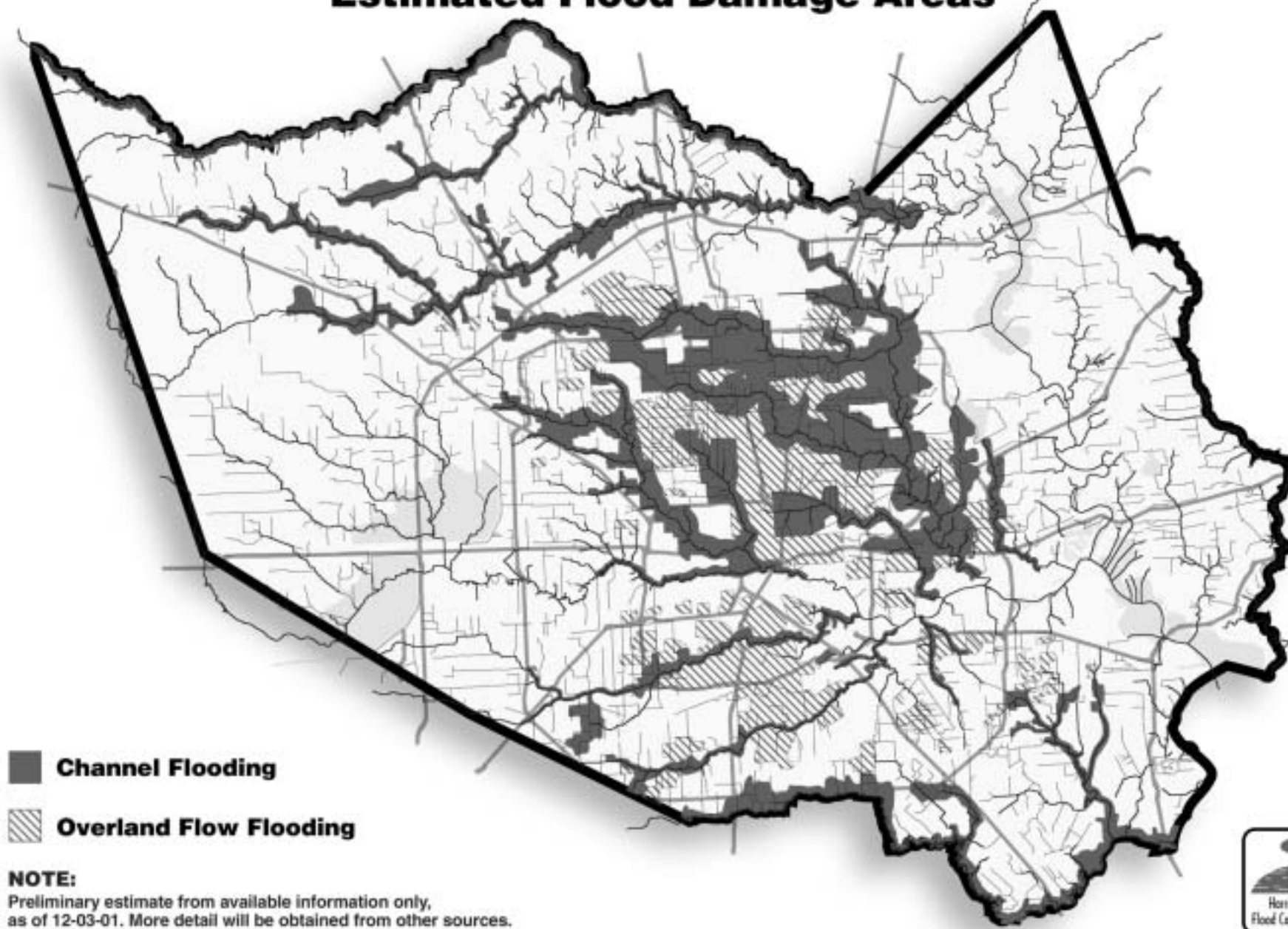


White Oak Bayou, I-45 and I-10 Interchange, Downtown,
6/9/01 am



Tropical Storm Allison

Estimated Flood Damage Areas

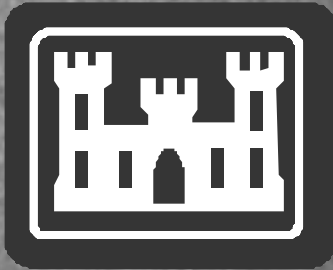


The Numbers for The Flood

- More than 2 million people *simultaneously* impacted by flooding
- Damage estimate - \$5 billion
- 22 deaths
- 73,000 homes flooded
- 95,000 cars flooded



The Partnership – Since 1937



**US Army Corps
of Engineers**



Federal Projects

- **Six Completed Projects**
- **Six Active Projects**
- **We'll spend \$30 million, this year**
- **Spend \$50-\$60 million in 4 years**
- **Typical local sponsor role until 1996**



WRDA 1996 – Section 211

“Construction of Flood Control Projects by Non-Federal Interests”

- **Allows local sponsor to take the lead in planning, design, and construction.**
- **Corps monitors and approves work**
- **Cost sharing the same**
- **Local sponsor reimbursed the federal share**



WRDA 1996 – Section 211

- **Corps rules and process followed**
- **Added a new capability for the partnership**
- **3 of 6 active projects – Sponsor lead**



Harris County Flood Control District's Mission Statement (1990)

To build urban flood control projects that work, with appropriate regard for community and natural values.

To reduce the risk of flood damage by:

- Devising the storm water management plan,***
- Implementing the plan, and***
- Maintaining the infrastructure***



THE Challenge

How do we incorporate environmental and aesthetic features into federal flood damage reduction projects?

- **Sounds easy, but hard to do.**
 - **What does the community want?**
 - **What is the process?**
 - **How much more will it cost?**
- **Some of our experiences, so far ...**



Locally Preferred Plan

Identify Federal interest based on economics only. If ANY environmental or aesthetic quality features are added, it's a locally preferred plan.

- There are situations where this should apply**
- Seems to contradict the Corps of Engineers' Environmental Operating Principles**



A Little Flexibility, Please

Either –

Allow a small deviation from the absolute NED economic plan for environmental and aesthetic quality features.

Or –

Allow a small increase in the project costs for such features, without having to include it in the economic justification.



A Real Example

Sims Bayou – 1992

In design phase as a uniform, trapezoidal channel enlargement with grass, CCM, & concrete lining

- Local environmental groups got involved**
- Congressman stepped in**
- Corps modified design**



Results

- **Modification included**
 - a varying bottom width
 - flood bench with trees
 - less concrete lining
- **Changes in outputs and costs < 5%**
- **Approved by Corps Headquarters and ASA(CW)**
- **People like what's been built**



SIMS BAYOU

Cellular Concrete Mat Construction in Channel Bottom





**Sims Bayou, Looking Upstream from I-45,
9/97**



**Sims Bayou – 1998
After Construction**

**Sims Bayou – 2002
3 Years Later**





Swallow St. Bridge





Sims Bayou, Swallow St., 6/9/01



Sims Bayou, Looking Upstream toward Swallow St., 6/9/01

Another Example

Brays Bayou – Upstream Element

- **In 1990 authorization:**
“Tree and shrub plantings are included ... to make the plan aesthetically pleasing and compatible with its suburban surroundings.”
- **Open-minded and progressive attitude in the Galveston District**



Results

- **Layout includes**
 - **a variable detention basin layout**
 - **water features**
 - **preservation of large trees along the old channel course**
- **People use the park while the detention basin is under construction**





Brays Bayou, Sam Houston Tollway Detention Basin



Aesthetic & Functional Berm Between Channel & Basin

D500-06 Compartment 1 Side Wier Looking South

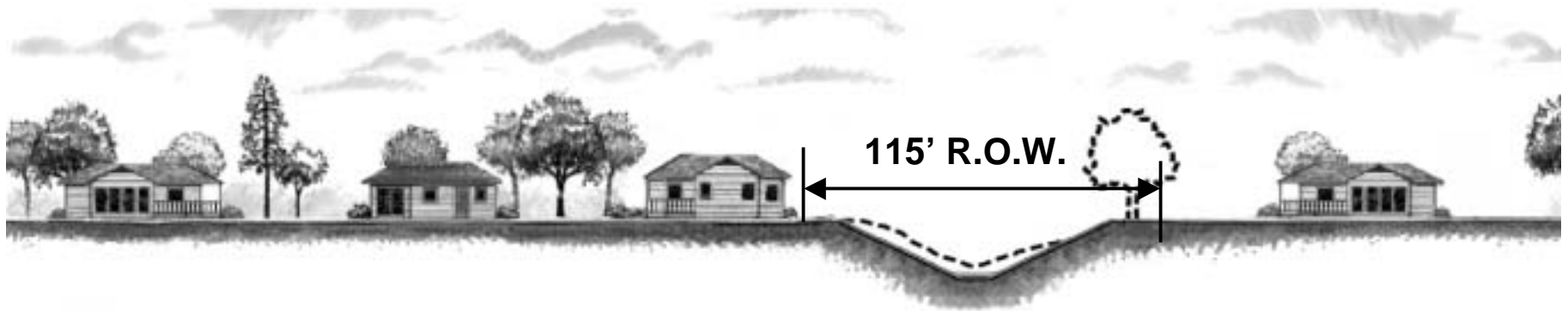


Public Use During Construction

Current General Reevaluations

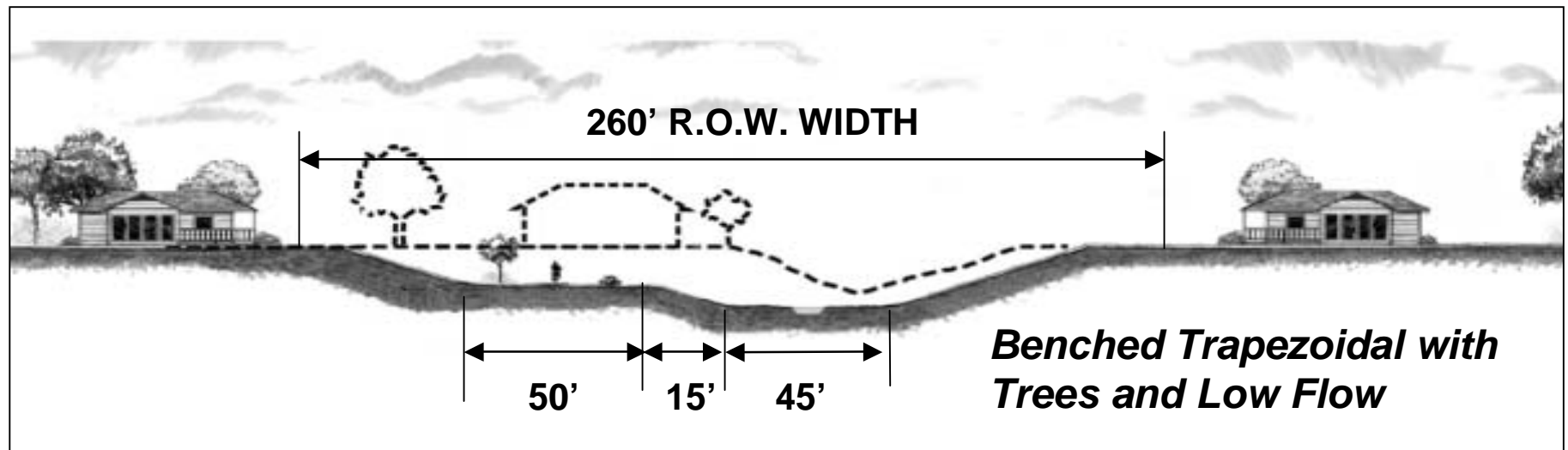
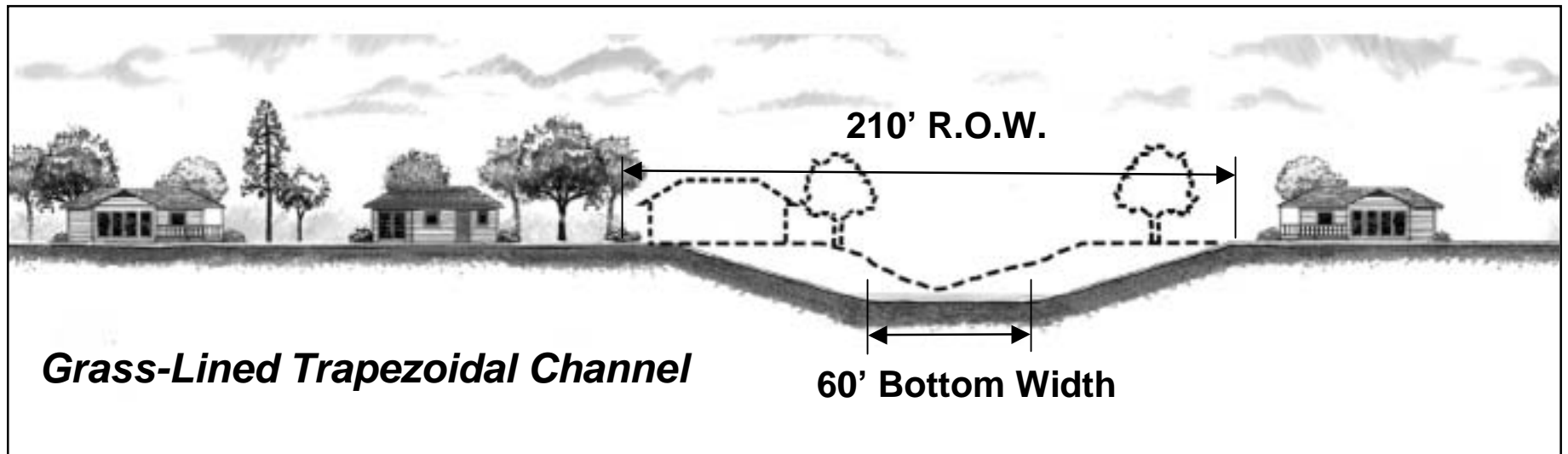
- **Hunting Bayou**
- **Greens Bayou**
- **White Oak Bayou**

HUNTING BAYOU

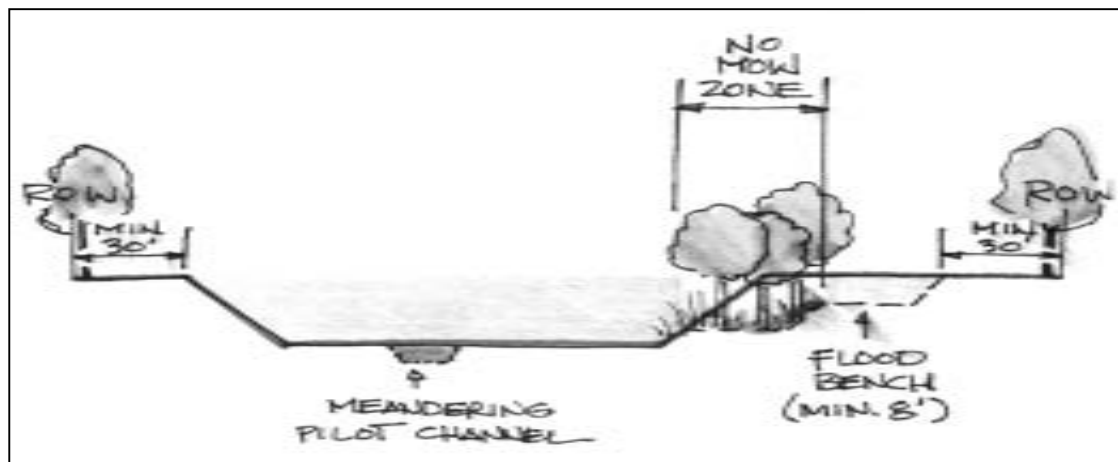


Concrete Channel

14' Bottom Width



GREENS BAYOU



WHITE OAK BAYOU



**29 acre Detention Basin
and Wetland Mitigation
(Mid-1990's)**



WHITE OAK BAYOU



**34 acre Detention Basin
Tree Preservation, and
Wetland Mitigation (1999)**





**White Oak Bayou - Championship Park,
Downtown Houston**

Empowerment

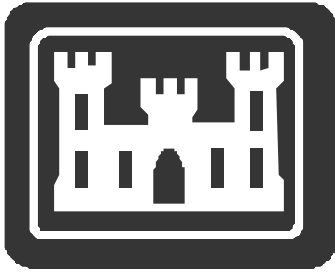
"Add minimal ecosystem restoration features to NED Plan."

Ideas:

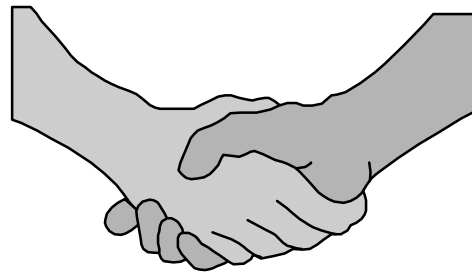
- **\$ amount \leq 5% of project cost, or**
- **fixed \$ amount.**

We strongly support this initiative. It gives us "a little flexibility".

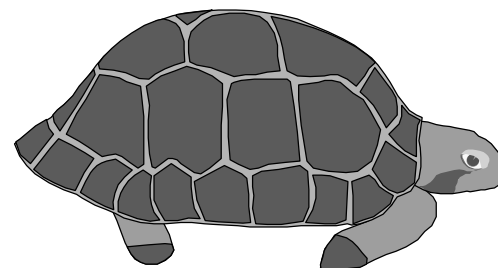
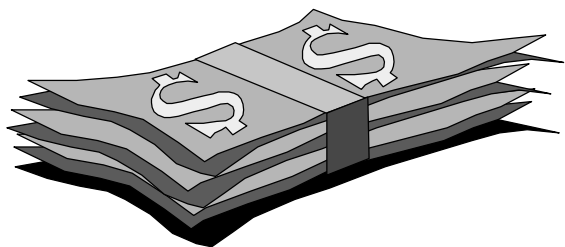
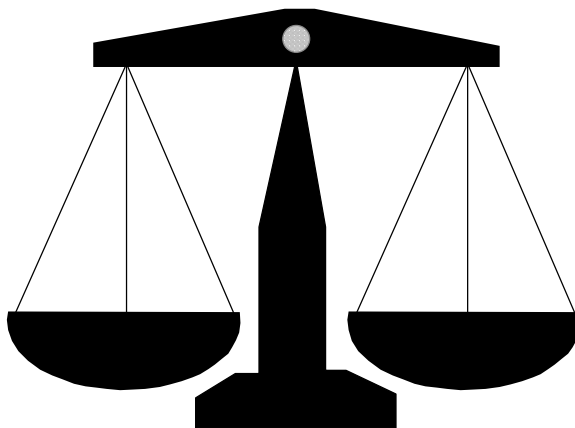
The Partnership – Still Going Strong



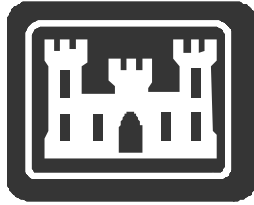
**US Army Corps
of Engineers**



We Want To Help . . .



It Takes A Lot Of Teamwork



**US Army Corps
of Engineers**





Buyout – Our Favorite Flood Damage Reduction Tool

The image shows a dark, textured map of Harris County, Texas. The map is rendered in a dark gray color with a grainy, paper-like texture. The outline of the county is visible, including its irregular shape and the Gulf of Mexico to the south. Overlaid on the map is the text "Harris County Flood Control District" in a serif font. The text is positioned in the lower-middle part of the map, with "Harris County" on the top line and "Flood Control District" on the bottom line. The text is a lighter shade of gray than the map background, making it legible.

Harris County
Flood Control District